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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,101	10/21/2003	Taro Osabe	XA-9953	3806
181	7590	06/14/2005	EXAMINER	
MILES & STOCKBRIDGE PC 1751 PINNACLE DRIVE SUITE 500 MCLEAN, VA 22102-3833			ECKERT II, GEORGE C	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/689,101	Applicant(s) OSABE ET AL.	
	Examiner George C. Eckert II	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 2-4 and 9-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/21/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 2-4 and 9-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 6, 2005.

Specification

2. The disclosure is objected to because of the following informalities: the paragraph bridging pages 20-21 contains the following errors:

- a. "silicon nitride 1008" should be --silicon nitride 1009--.
- b. "silicon gains 1001" should be --silicon grains 1011--.

Appropriate correction is required.

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 2815

4. Claims 1 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,531,735 to Kamigaki et al. Kamigaki et al. teach in figure 14 and describe in columns 12-14, a semiconductor memory element comprising:

a well region 1 having a first conductivity type and formed in a principal surface of a substrate;

source 4-1 and drain 4-2 regions each having a second conductivity type and formed in the well region to have a specified distance therebetween;

first 6-1 and second 6-2 gates and a charge storage region 2 each formed on a portion of the principal surface of the substrate and interposed between the source and drain regions via a first insulating film (inherent); and

a third gate 7 formed over the charge storage region via a second insulating film (inherent),

the charge storage region being provided between the first and second gates (see fig. 14).

Regarding claim 6, Kamigaki et al. teach that the charge storage region 2 has a silicon nitride thin film (col. 13, lines 16-18).

5. Claims 1 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,815,759 to Horiguchi et al. Horiguchi et al. teach in figure 1b, a semiconductor memory element comprising:

a well region 1 having a first conductivity type and formed in a principal surface of a substrate;

source 21 and drain 22 regions each having a second conductivity type and formed in the well region to have a specified distance therebetween;

first and second gates 11 and a charge storage region 5 each formed on a portion of the principal surface of the substrate and interposed between the source and drain regions via a first insulating film 4 and 10 and

a third gate 7 formed over the charge storage region via a second insulating film 6,

the charge storage region being provided between the first and second gates (see fig. 1b).

Regarding claim 8, Horiguchi et al. teach that the charge storage region 5 has a floating gate comprised of polysilicon (col. 9, lines 31-33).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over either of Kamagaki et al. or Horiguchi et al. in view of 6,531,731 to Jones, Jr. et al. Kamagaki et al. and Horiguchi et al. both taught the device of claim 1 but did not expressly disclose that the charge storage region was composed of semiconductor nano-crystals. Jones, Jr. et al. teach in figure 9 a memory device comprising silicon nano-crystals 24 (col. 3, lines 7-16) as the charge storage layer (col. 2, lines 21-22).

Either of Kamagaki et al. or Horiguchi et al. is combinable with Jones, Jr. et al. because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to use semiconductor nano-crystals as the charge storage element. The motivation for doing so, as is taught by Jones, Jr. et al., is that such nano-crystals allow thin tunnel oxide and thus high speed operation (col. 2, lines 21-23). Therefore, it would have been obvious to combine either Kamagaki et al. or Horiguchi et al. with Jones, Jr. et al. to obtain the invention of claim 5.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Kamagaki et al. or Horiguchi et al. as applied to claim 1 above in view of 6,710,409 to Vyvoda. Kamagaki et al. and Horiguchi et al. both taught the device of claim 1 but did not teach that the charge storage region has a silicon oxynitride thin film. Vyvoda teaches in column 3, lines 7-21 that silicon oxynitride thin films are materially equivalent to polysilicon floating gates and silicon nitride films. As such, it is considered obvious to form the device of either Kamagaki et al. or Horiguchi et al. having a silicon oxynitride layer as the charge storage region as it is merely a substitution of materials known to perform the same function.


Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional prior art teaches structures similar to that instantly claimed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


GEORGE ECKERT
PRIMARY EXAMINER